

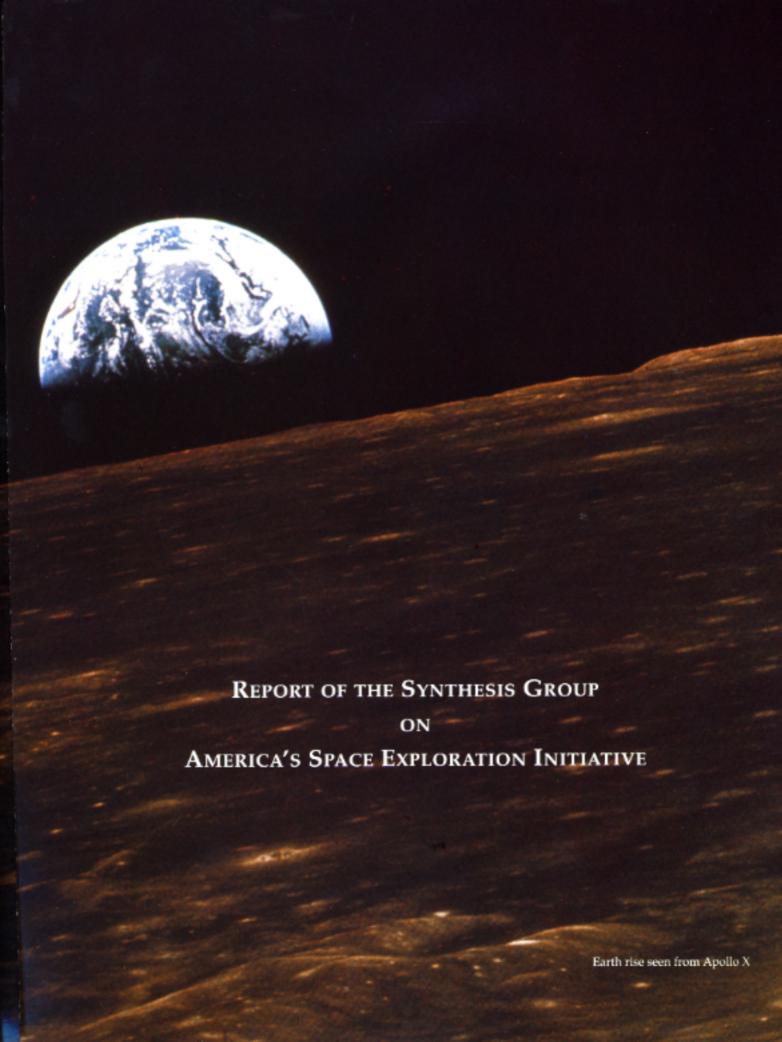
AMERICA AT THE THRESHOLD



SPACE EXPLORATION INITIATIVE

AMERICA AT THE THRESHOLD







THE VICE PRESIDENT

WASHINGTON

May 6, 1991

Lieutenant General Thomas P. Stafford, USAF (RET.) Chairman, Synthesis Group 1225 Jefferson Davis Highway, Suite 1501 Arlington, VA 22202

Dear Tom:

President Bush challenged us to chart a course to the future, for the benefit of humanity. His vision of America's future in space, the Space Exploration Initiative, will enable our nation to journey together back to the Moon and on to Mars. Your report meets that challenge.

You have offered the nation several alternatives which demonstrate a thorough understanding of the imperatives of space, an appreciation of political and economic realities, and concern for humanity's needs on Earth. Your effort represents an integral part of a balanced plan of exploration, future acquisition of scientific knowledge, and future space leadership. I am grateful to you and your associates for this landmark contribution.

I want to express our sincere appreciation to you and the Synthesis Group for a thorough, useful, and timely effort. As we journey back to the Moon and on to Mars, we will be mindful that the Synthesis Group roadmap suggested the way. And as humanity benefits from the fruits of this journey, we will acknowledge President Bush's vision and your translation of that vision into a robust, safe, affordable and beneficial voyage.

Sincerely,

Dan Gya

Synthesis Group

May 3, 1991

The Honorable J. Danforth Quayle Chairman, National Space Council The White House Washington, D.C. 20500

Dear Mr. Vice President:

I am pleased to submit the attached report "America at the Threshold" in response to your request. This report is the result of contributions by a great number of people desiring to participate in the Space Exploration Initiative. The Outreach Program, implemented by NASA, included studies by the American Institute of Aeronautics and Astronautics, proposals from individuals throughout the nation and contributions from government departments and industrial concerns. These all combined to form the basis of our evaluation. With the advice and counsel of senior members, this report was prepared by a group of dedicated experts made available to the Synthesis Group by departments and agencies throughout the government, private corporations and universities.

Our conclusions support America's goal to provide this generation a robust, safe, and affordable future in space while ensuring the greatest benefit for mankind on Earth.

Sincerely,

Thomas P. Stafford

Lieutenant General USAF (Ret.)

Chairman, Synthesis Group

FOREWORD

here are times when seemingly small decisions reverberate through the centuries. Now is such a time. The decisions we make now for space will set the nation's course for decades, if not centuries to come. The legacy we leave to future generations may well be decided in these next few years.

The Past

In the 15th century, China may well have been the most technologically and culturally advanced state on Earth. It owned great fleets of large oceangoing ships. In 1433, a fleet of Chinese ships sailed all the way to Africa, trading, exploring, and advancing Chinese culture. But the Ming Empire had other priorities — problems at home, pressing needs elsewhere. They recalled the fleet — and then they burned it. They wanted to bring an end to "wasteful" exploring. And they also wanted to ensure that Chinese explorers would not even be tempted to venture forth again for a long, long time.

At about the same time that China was burning its fleet, a small European nation's farsighted leader, Prince Henry of Portugal — now known as Henry the Navigator — sent ships up and down the coast of Africa. Soon another European nation, Spain — just emerging from centuries of war and turmoil — also began an exploration program. For a time, Portugal and Spain competed to explore and use the new world

that Spain discovered.

Portugal did not completely abandon exploration, as China did. But Portugal soon lost out to Spain through gradual loss of sea exploration capabilities. Spain went on to reap the harvest of two continents — ushering in a golden age for its people which was to last almost two centuries. With the destruction of the Spanish Armada, the British seized the leadership position with such expeditions as Sir Francis Drake's world voyage and Captain Cook's Pacific voyages.

Nations lose their leadership position when they give up the role of exploration. The question now fac-

ing the United States is which path to take with regard to "oceans" of the 21st century.

The Present Challenge

In 1989, President George Bush challenged America in a way no one has challenged us before, "... back to the Moon, back to the future. And this time, back to stay. And ... a journey into tomorrow ... a manned mission to Mars." In the history of the human race, no technological challenge has been so great, and no goal so distant. Likewise, there has never been a nation like ours, nor an opportunity so promising.

Ours is a rapidly changing world. To remain competitive and maintain world leadership in the 21st century, America will need the best trained and educated work force, the most advanced technology and the strongest leadership. We now have goals that challenge our abilities far beyond what we've experienced

before.

The Space Exploration Initiative is a vision for the 21st century. It is a vision of America reaching beyond itself, and onward, beyond the very bounds of this planet to an entirely new world. On the way there, we

Im Stafford

will reap the real, tangible benefits of space exploration.

Space is clearly our most challenging frontier. Enroute to Mars, we will explore the Moon, advance Earth sciences, and develop new, innovative technologies. We will tap lunar, Martian and solar energy resources as we explore the heights of human talent and ability. Along the way, America's drive, initiative, ingenuity and technology — all those things that have made our nation the most successful society on Earth — will propel us toward a future of peace, strength and prosperity. The challenge is before us. This report shows how we begin.



"We are living at the very beginning of time. We have come into being in the fresh glory of dawn, and a day of almost unthinkable length stretches before us with unimaginable opportunities for accomplishment. Our descendants of far-off ages, looking down this long vista of time from this other end, will see our present age as the misty morning of human history. Our contemporaries of today will appear as dim, heroic figures who fought their way through the jungles of ignorance, error, and superstition to discover truth."

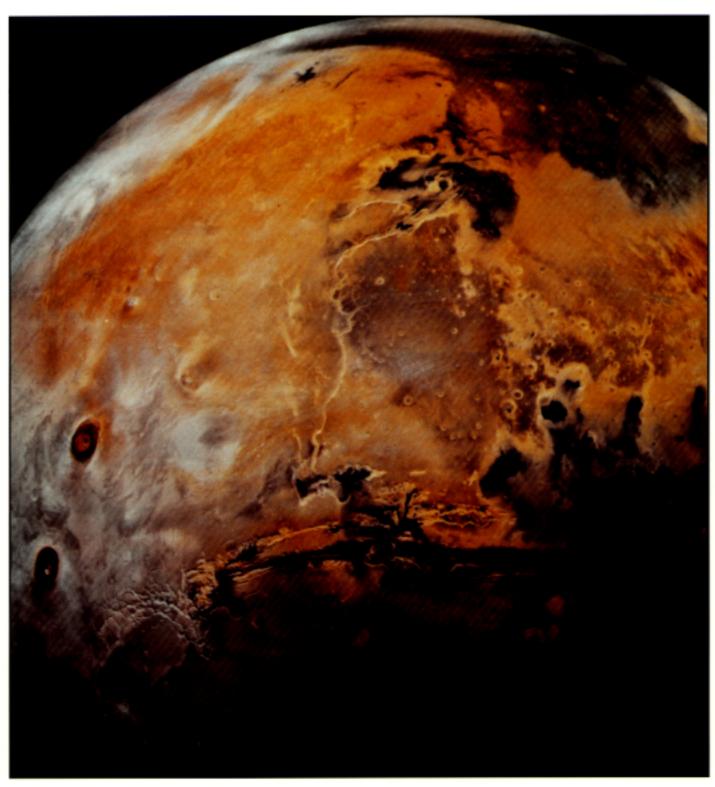
Sir James Jeans, Astronomer, 1930

The Earth Viewed from Apollo X



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Mars Mosaic from Viking Orbiter 1